CLAIMS

1. A Solar System of Single Point Focusing S/S (500_A) for Solar Lighting, Solar Air-Conditioning and Solar Water-Heating, which is characterized by that it is equipped with corrected Primary Parabolic Total Reflection Reflector (501_A) and Secondary Ellipsoidal Reflector (201_A) as well as the corrected Solar Arteries (551_A) and the Accessories of the Arteries (571_A) and (581_A), which are all equipped with Curved Rectangular Prisms (CRP) (007_A), (CRP) ($007'_A$) and (556_A) correspondingly, so that the imperfections of the simple conventional rectangular total reflection prisms are raised.

It is characterized also by the fact that it is designed for the supply of Solar Lighting in a building and the parallel production of cooling and thermal energy.

Also by the fact that the construction of the Structural Elements of the S/S (500_A) is effected as it is described below:

The primary Parabolic Total Reflection Reflector (PTRR) (501_A) consists of an extract of a parabolic reflector [which is referred also as (101_A) as well and where the extract is understood as an extract whatsoever of the full reflector including also the full reflector]. The primary PTRR (501_A) can consist of for example 1,2,3,4 or even more Tiles of Total Reflection (TTR) (131_A) based on an appropriate parabolic substrate, each-one with main dimensions 20x20cm approximately so that the (TRR) (131_A) can be produced at a low cost by existing automated glass-impression machines. The material of the (501_A) and (131_A) consists e.g. of water-clear glass without iron oxide or of transparent plastic self-supporting or supported on an appropriate substrate.

Also by the fact that the Front Surface (113_A), of the TRR (131_A) has a smooth parabolic form, while the Rear-Surface (113_Γ) is also parabolic and bas-relief and consists of Corrected Rectangular Prisms (007_A) [which are referred as (114_A) as well], of which the Top Acmes (115_A) converge and meet at the Top (102_A) of the full Parabolic Total Reflection Reflector (101_A) [which coincides here with the primary PTRR (501_A), while the cross-sections of the sides of the Corrected Rectangular Prisms CRP (114_A) or (007_A) are not straight-lines but they are the corrected curves of the CRP (114_A) or (007_A) so that an accurate focusing is succeeded.

Also by the fact that it has the Symmetry Axis (551_A) as well (which points to the sun) and the Rotation Axes (512_A) and (512_Γ) (Horizontal and Vertical correspondingly).

Also by the fact that the primary PTRR (501_A) is based on a metallic Supporting Frame (505_A) (e.g. structured as the parabolic plate of a satellite television antenna made of pressed aluminum sheet), which is based on the Vertical Rotation Mechanism (508_A), which is based on the Horizontal Rotation Mechanism (508_B) [analogous with the Mechanisms (108_A) and (109_A) below] and with the help of the

two Bearings (508_{Γ}) it is based on the Supporting Base (510_B).

Also by the fact that the Secondary Total Reflection Reflector (STRR) (201_A) consists of an extract of ellipsoidal reflector analogous of this one of the corresponding (501_A) and is made of the same material as the corresponding (501_A).

Also by the fact that the STRR (201_A) consists of e.g. 1,2,3,4 or even more Total Reflection Tiles (TRT) (231_A), which are based on the metallic Supporting Frame (507_A) which is based on the Supporting Frame (505_A).

Also by the fact that the Front Surface (213_A) of the TRT (231_A) has a smooth paraboloidal or ellipsoidal by rotation form (depending on whether the (201_A) is located in front or behind the Focus (504_A)], while the Rear Surface (213_{Γ}) is also paraboloidal or ellipsoidal and bas-relief and consists of Corrected Rectangular Prisms (214_A), whose Acmes (215_A) converge to the Top (202_A) of the (201_A), while the cross-sections of the Sides (233_{Γ}) of the Corrected Rectangular Prisms (CRP) (214_A) are not straight-lines but they are the corrected curves of the CRP so that an accurate focusing is accomplished.

Also by the fact that the primary Total Reflection Reflector (501_A) [corrected with CRP (007_A) or (114_A)] creates the Wide Beam of Rays (052_A), which incides and is reflected backwards by the Secondary Reflector (201_A), which here is designed ellipsoidal by rotation in appropriate size and is placed behind of the Focus (504_A), so that it shrinks to the desirable grade the Solar Image and this way the Narrow Beam of Rays (053_A) is created with the desirable beam angle (e.g. smaller than $\pm 5^0$)

It is also characterized by the fact that the S/S (500_A) possesses a Reflection Medium (231_C) of the Narrow Beam of Rays (053_A) before it focuses on the Focus ($504'_B$) (e.g. a Total Reflection Reflector with parallel rear surface total reflection prisms) placed in a 45^0 angle towards the Narrow Beam Axis (053_A), very close and behind the Focus ($504'_B$) and very close to the Entrance of the Solar Artery (551_A) so that it reflects the Narrow Beam (053_A) into the Solar Artery (551_A), which is placed with its opening close to the Focus (504_A) of the reflected Narrow Beam (053_A) and its Axis (553_A), which is parallel to the one of (053_A). In those occasions or during that time of the day when the Solar Lighting is not needed inside the building, the TRR (231_{Γ}) or some of them may be drawn away, and thus the Narrow Beam will focus straight onto a selective black absorbent surface (562_A) which is placed on the Focus ($504'_B$) which will transfer the heat of the Beam (053_A) into the Working Fluid (502_E) [which will be utilized as hot water or as cooling power used for air-conditioning through the Adsorption Heat Pump (519_A) with Silicagel etc].

Also by the fact that the reflected Narrow Beam of Rays (053_A) will be focused on the Center (552_A) of the Solar Artery (551_A), which is placed at the final Focus (504_B) with

the Axis (553_A) of the Solar Artery parallel to the Narrow Beam Axis (053_A). The Solar Artery (551_A) is constructed with corrected Curved Rectangular Prisms (556_A) for minimization of the losses and subsequently, the Narrow Beam (053_A) of the solar spectrum, through the Solar Arteries (551_A) is transferred to the internal of the building to be used for natural lighting through special Solar Lighting Fixtures (SLF) (591_A).
Also by the fact that for many primary Reflectors (501_A) concentrating the Solar Radiation, which have been arranged in series on a fixed basis or on a rotating basis, which floats, the Solar Arteries (551_A) of each Primary Reflector (501_A) are gathered through Corner Accessories (571_A) to the Main Multiple Corner Accessory (581_A) with which each Solar Beam (053_A) of the Solar Arteries (551_A) of each Primary Reflector (501_A) are inserted into the Main Artery ($551'_A$) and transferred to the internal of the Building where the Solar Radiation (053_A) is distributed in the reverse way to each floor by Multiple Corner Accessories (581_A) to smaller Arteries that transmit the light to the rooms we want to illuminate and there the final distribution to lighting fixtures is effected either by Solar Arteries (551_A) of small diameter or by optical fibers of large diameter, where for the achievement of constant level of lighting into the rooms, when the intensity of the available Solar Radiation changes there will exist conventional fluorescent lamps which through a Dimmer will keep the lighting level constant, increasing or decreasing correspondingly the lighting flux of the fluorescent lamps.

2. A Solar System of Single Point Focus S/S ($500'_A$) for Solar Lighting, Solar Air-Conditioning and Solar Water-Heating, which is constructed as the S/S (500_A) in the Claim 1 and has structural elements with the same numbers.
It is characterized though by the fact that the Reflection Medium (231_C) is a plain Cold Mirror (231_Γ), where the S/S ($500'_A$) is characterized by the fact that the Narrow Beam of Rays (053_A) before it focuses on the Focus ($504'_B$) it is crossed by the plain Cold Mirror (231_Γ) at a 45^0 angle towards the Axis of the Narrow Beam (053_A), which will reflect only the visible part of the spectrum (from λ=0,4 until λ=0,7μm) with a coefficient of reflectivity over 96%, at an angle of 90^0 towards the Solar Artery (551_A) [which is placed with its Opening at the Focus (504_A) of the Narrow Beam (053_A) and its Axis (553_A) parallel to the one of the (053_A)], while it will allow the infrared (IR) part of the spectrum (from λ=0,7 to λ=2,4μm) to pass through it with very few absorption losses in the order of 5-10%, where the IR part of the Narrow Beam (053_A) will focus directly onto a selective black Absorbing Surface (562_A) placed at the Focus ($504'_A$), which will transfer the heat of the IR Beam (053_A) to the Working Fluid (502_E) [which will be utilized as hot water or as cooling power used for air-conditioning through the Adsorption Heat Pump (519_A) with silicagel etc], avoiding at the same time to transfer

the heat of the IR part of the solar spectrum into the building, saving that way the corresponding power of the Chiller of the Air-conditioning Units of the building.

Also by the fact that subsequently, the Narrow Beam (053_A) of the total or part only of the solar spectrum, through the Solar Arteries (551_A) is transferred to the internal of the building to be used for natural lighting through special Solar Lighting Fixtures (SLF) (591_A).

Also by the fact that compared with the conventional P/V Systems the present Solar System S/S (500_A) produces or substitutes more than 10 times in electrical and 3 times in thermal or cooling power (for hot water or air-conditioning power).

3. A Solar System S/S ($100_{A,B}$), which is constructed as the S/S (500_A) in the Claim 1 but it is characterized by that it includes only a complete (or whatsoever extract of the complete) primary Parabolic Reflector of Total Reflection (PRTR) (101_A) with Top the point (102_A) where the Solar Rays (051_A) after their incidence on the primary PRTR (101_A) create the first reflected Wide Beam of Rays (052_A), which focus on the Focus (104_A) and they are utilized straight there focusing on the P/V Cells (302_A) with the help of the Auxiliary Reflector (363_A), and thermal or cooling energy in the form of hot water from the cooling of the P/V Cells (302_A) and the use of the Adsorption Heat Pump with Silicagel, where the Reflector (101_A) is based on the metallic Supporting Rings (105_A) (External) and (105_Γ) (Internal), which are supported by the metallic Supporting Brackets (107_A), which are based on the Horizontal Rotating Head (108_A) and the Head (108_A) is based on the Pillar / Vertical Rotating Mechanism (109_A), which is based on the Base (110_A).

Also by the fact that the Total Reflection Reflector (101_A) consists e.g. of transparent water clear glass without iron oxides [one-piece for small surfaces or consisted of Total Reflection Tiles (TRT) (131_A), which consist part of the Parabolic Surface ($113'_A$) and for larger surfaces based on an appropriate parabolic substrate] or of transparent plastic self-supporting or based on an appropriate substrate, where the Front Surface (113_A) of the ($113'_A$) has a smooth parabolic form, while the Rear Surface (113_Γ) has a bas-relief parabolic form and is parallel with the (113_A) and consists of Corrected Curved Rectangular Prisms (114_A), whose Top Acmes (115_A) converge and meet at the Top (102_A) of the Reflector (101_A), which has the Symmetry Axis (111_A) (which aims to the Sun) and the Rotation Axes (112_A) and (112_Γ) (Vertical and Horizontal correspondingly).

4. A Solar System S/S (100_A), which is constructed as the S/S ($100_{A,B}$) in the Claim 3 above, but it is characterized by the fact that the Solar Rays (051_A) after their incidence on the primary PRTR (101_A) create the first reflected Wide Beam of Rays

(052_A), which focus on the Focus (104_A) and after they reflect on the Secondary Reflector (201_A) [which is supported with the Brackets (207_A) on the Ring (105_A)], they create the Narrow Beam of Rays (053_A), which reaches the Final Focus (201_A) and focuses there on the P/V Cells (302_A) with the help of the Auxiliary (363_B) as well, which are based on the Ring (105_Γ).

Also by the fact that the Secondary Reflector (201_A) has a paraboloid or ellipsoid form by rotation [depending on whether it is placed in front or in the back of the corresponding Focus (104_A), at the present occasion it is designed ellipsoid for shrinking the Solar Image] and may consist of 1,2,3,4 or even more Total Reflection Tiles (TRT) (231_A), of which the Front Surface (231_Γ) is smooth ellipsoid, while the Rear Surface (213_Γ) is bas-relief ellipsoid and parallel to the (213_A), and consists of Corrected Curved Rectangular Prisms (CRP) (214_A), whose Top Acmes (215_A) converge and meet at the top (202_A) of the Reflector (201_A).

5. A Solar System S/S (600_A), which is constructed as the S/S ($500'_A$) and the S/S (100_A) in the Claims 2 and 4 above, but it is characterized by the fact that it is designed for the production of Electrical Energy on top of the Solar Lighting and the production of Cooling or Thermal power of the S/S ($500'_A$) by adding the Structural Elements which are related with the P/V [the P/V Cells (302_A), the Auxiliary Reflectors (363_A), the Cables (340_A) and the Batteries or the Inverter] to those ones of the S/S ($500'_A$).

Also by the fact that all Structural Elements (S/E) of the S/S (600_A), which are similar with those of the S/S ($500'_A$) and the S/S (100_A) are named with the same names and code numbers as the ones of the S/S ($500'_A$) and the S/S (100_A), but they change the first code number from 5 or 1 into 6 [for example the Vertical Axis of Rotation (512_A) of the S/S (500_A) is changed into (612_A) in the S/S (600_A), while the (302_A), (363_A) and (340_A) of the S/S (100_A) are changed into (602_A), (663_A) and (640_A) in the S/S (600_A) respectively] and they are modified respectively fort the kind of operation of the S/S (600_A) [for example the Absorption Surfaces (662_A) are not needed any more to be covered with a selective coating for the absorption of radiation and the P/V Cells (602_A) can be also sensitive to the IR], where for this purpose the P/V Cells IR (602_A), the Cables and the Auxiliary Reflectors (663_A) are added on top of the Heat Absorption Surfaces (662_A) behind the Cold Mirror (631_C) at the Final Focus (604_B), utilizing this way the incident concentrated radiation first for the production of P/V electrical Energy and then for the production of hot water as above.

6. A Solar System as in the Claims 1, 2, 3, 4 and 5 above, which is characterized by the fact that it uses the Corrected Parabolic Reflectors of Total Reflection (001_A) with

Curved Rectangular Prisms (007_A), which are characterized by the fact that at their external bas-relief surface instead of the conventional rectangular prisms (007_a) of the conventional TRR, which converge to the Top of the parabolic reflector, they bear Curved Rectangular Prisms (CRP) (007_A), which differ from the (007_a) by that their sides $H'_1\Theta'$ and $\Theta'H'_2$ are curved and they have at their eventual point K1 a curvature angle $\varphi 2 = 1/2\ \varphi_1$, where φ_1 is the angle of the arc $K'_1\ O'_1$ of the Periphery $\Pi_1 = (013_A)$, which results as a section in the area of O1 of the Plain (013_A) with the Internal Surface (004_A) of the parabolic TRR (001a) [and where the points K'1O'1 are the projections of the K_1 and Θ on the $\Pi_1 = (013_A)$].

Also is characterized by the fact that with the use of the (CRP) (007_A) the parabolic TRR (001_A) correct the diffusing-imperfection of conventional TRR and achieve perfect Focus, where e.g. the emerging from the TRR (001_A) Ray $K_{10}'\Delta_0''$ (which come from the incident A_0K_{10}') does not deviate from the routing for focus $K_{20}'\Delta_0'$ at $\varphi_4 = 3\varphi_1$ as it is the case in conventional TRR with rectangular prisms but follows the $K_{20}'\Delta''$ and focuses with precision, making possible the achievement of very big concentration ratios (in the order of the 500-1000 suns or even more), where the parabolic TRR (001_A) are manufactured from transparent material with index of refraction $n > \sqrt{2} = 1{,}41$ e.g. transparent plastic (acrylic etc) or waterclear common glass. They are constituted by the Bas-relief External Surface (002_A), which bears the Curved Rectangular Prisms (007_A), has the Symmetry-axis (003_A), the smooth parabolic Internal Surface (004_A), the Periphery $\Pi = (005_A)$, the Incident Ray $A_0K_{10}' = (006_A)$, the Emerging Ray $K'_{20}\Delta_0''$, the Focus E_0, the Auxiliary Focus E in the level of $\Pi_1 = (013_A)$, the Height of CRP (008_A) (007_A), the width of CRP (009_A), the Diameter $\Delta = (010_A)$ of $\Pi = (005_A)$ and finally it can give e.g. the Rectangular Extract (301_A) of the Internal Surface (004_A), which can be used as primary parabolic CRP in other Solar Systems.

7. A Solar System as in the Claims 1, 2, 4 and 5 above, which is characterized by the fact that it uses the Corrected Ellipsoidal by Rotation Total Reflection Reflectors (201_A) with Curved Rectangular Prisms ($007'_A$), which are constructed as Corrected Parabolic TRR (001_A) in Claim 6 above, are characterized however by the fact that instead of parabolic it is ellipsoidal by rotation and where all the Numbers of their structural elements are stimulated by tones [e.g. ($001'_A$), ($002'_A$), ($003'_A$), ($004'_A$), ($005'_A$), ($006'_A$), ($007'_A$), ($008'_A$), ($009'_A$), ($010'_A$), (012_A), (013_A)], while the equivalent ($301'_A$) rectangular Extract Ellipsoidal by Rotation is named (231_A) and is used as Secondary Prism (301_A) in other Solar Systems.

8. A Solar System as in the Claims 1, 2, 5, 6 and 7 above, which is characterized by

the fact that it uses the Corrected Solar Arteries (551_A) with Curved Rectangular Prisms (556_A), which are characterized from that their external bas-relief surface, instead of conventional total reflection rectangular prisms (556_A) which bear the conventional Solar Wave Guides, they bear the corrected Curved Rectangular Prisms (CRP) (556_A), that differ from (556_A) because their Sides $H_1'\Theta'$ and $\Theta'H_2'$ are curved and have in any point K_1 an angle of curvature $\varphi_2 = \varphi_1/4n$ where n is the index of refraction of the material (556_A) and φ_1 is the angle of arc $K_1'O_1'$ of the internal Periphery Π = (555_A) of the Solar Artery (551_A) [and where points $K_1'O_1'$ are projections of K_1 and Θ above on Π= (555_A)].

Also by the fact that with the TRR (556_A) the Solar Arteries (551_A), correct the imperfection of diffusing (reason of losses) of the conventional Rectangular prisms and they achieve that the outgoing rays after their reflection in the (TRR) (565_A) they emerge parallel to the entering rays and thus they ensure that in the next reflections they will go through the Entry-Circle K_2 = (560_A) and will ensure a total reflection by the next TRR (556_A), limiting by one or even more orders of magnitude the diffusing-losses of the Solar Arteries (551_A), in regard the conventional Hollow Solar Waveguide giving to the (551_A) one or even more orders of magnitude bigger ranger for the same percentage of losses. Also by the fact that, because the light travels inside the material of a Solar Artery (551_A) 10-100 times less than the light that travels the same length inside optical fibers, it results that the losses of (551_A) for the same length with optical fibers, they are 10-100 times smaller and consequently its range for the same level of losses is 10-100 times bigger than the corresponding optical fiber-waveguide. Also by the fact that it is constructed from a thin, hollow Pipe from clear transparent material (but also from common waterclear glass), with Center of Opening (552_A) with Axis (553_A), with Thin Cylindrical Walls (554_A), with Smooth Internal Surface (555_A), Curved Rectangular Prisms (556_A), the Acmes (557_A), the TRR (556_A), the rectangular Top-Corners (558_A), the TRR (556_A), the Entrance-Circle (560_A) and the Marginal Circle (561_A).

9. A Solar System as in the Claims 1, 2, 5, 6 and 7 above, which is characterized by the fact that it uses the Corrected Solar Arteries ($551'_A$) with Curved Rectangular Prisms ($556'_A$), which is constructed as the corrected Solar Arteries (551_A) in Claim 8 above, but are characterized by the fact that they bear Curved Rectangular Prisms ($556'_A$), which differ from (556_A) in their Sides $H_1'\Theta'$ and $\Theta'H_2'$ which are curved and have at any point K_1 an angle of curvature $\varphi_1/4n<\varphi_2\leq\varphi_1/2$ where φ_1 is the angle of arc $K_1'O_1'$ of the internal Periphery Π=(555_A) of the Solar Artery ($551'_A$) [and where points $K_1'O_1'$ are projections of the K_1 and Θ above on Π= ($556'_A$)], [instead of $\varphi_2 = \varphi_1/4n$ (551_A)] and the structural elements bring the same characteristic numbers as (551_A)

stimulated by tones

10. A Solar System as in the Claims 1, 2, 5, 6, 7, 8 and 9 above, which is characterized by the fact that it uses the Network-Elements of Solar Artery as the Corner Element (571_A) and the Multiple Corner Element (581_A) which are characterized by the fact that they allow change of direction of the Solar Artery (551_A) at big angles (e.g. 90^0 etc.) without losses when we have entrance-angle of Beam (053_A) $-5^0<\varphi<5^0$, therefore we use Total Reflection Reflectors (575_A) or (582_A) and with small losses when $-45^0<\varphi<+45^0$ we use conventional Reflectors (574_A) or (584_A) and Prisms ($571'_A$) or ($581'_A$), also by the fact that the incoming or outcoming Solar Arteries (551_A) from the (571_A) or (581_A) can be turned around their axis and from that they are constituted by the (571_A) from the incoming and outcoming Solar Arteries (551_A) (fixed and turned) by the Reflectors (574_A) (conventional) or (557_A) (Total Reflection) and by the Prism ($571'_A$) while the (581_A) by the incoming and outcoming Solar Arteries (551_A), by the Reflectors (582_A) (Total Reflection) or ($582'_A$) (conventional) and by the Prism ($581'_A$), by the Supporting frame (583_A) and by the Big Solar Artery (561_A) as well as by the fact that the (571_A) can become an Element of Subtraction ($571''_A$) and that the (581_A) can be a collecting Element [in the Big Solar Artery (561_A)] and a Distribution One in the small Solar Arteries (551_A) from Big One (561_A), as well as by the fact that the (571_A) and the (581_A) create the Network of Collection (590_A) or the Network of Distribution (590_B) for the supply of Solar Lightning (591_A) inside the Building.